

SFST.03USU1

CLAIM AMENDMENTS

The present listing of claims replaces all prior versions and listings of claims in the subject patent application.

Listing of Claims:

Claim 1 (currently amended): A heating apparatus comprising a heating element selected from the group consisting of conductive polyaniline fiber, conductive polyaniline yarn comprising conductive polymer fiber, fabrics comprising conductive polyaniline fiber or conductive polyaniline yarn, and non-conductive substrates supporting conductive polyaniline fiber or conductive polymer yarn, wherein said conductive polyaniline fiber comprises at least one dopant such that said conductive polyaniline fiber is characterized by an as-spun conductivity of ≥ 100 S/cm said conductive polyaniline fiber having a chosen diameter, and wherein the conductivity of said conductive polyaniline fiber is substantially—irreversibly destroyed at temperatures lower than the temperature at which said conductive polyaniline fiber loses said at least one dopant, or the temperature at which said at least one dopant decomposes, when a voltage or current greater than a voltage or current characteristic of the conductive polyaniline fiber is applied thereto by said means for passing a voltage or a current through said heating element; and means for passing a voltage or a current through said heating element.

Claim 2 (original): The heating apparatus as described in claim 1, wherein said fabrics are selected from the group consisting of woven, knitted, stitched and braided fabrics.

Claim 3 (canceled)

Claim 4 (canceled)

SFST.03USU1

Claim 5 (currently amended): The heating apparatus as described in claim 1, wherein structural integrity of said conductive polyaniline fiber is not significantly affected when the conductivity thereof is ~~substantially irreversibly~~ destroyed as a result of the voltage or current characteristic of said conductive polyaniline fiber being applied thereto.

Claim 6 (currently amended): The heating apparatus as described in claim 1, wherein the temperature at which the conductivity of said conductive polyaniline fiber is ~~substantially irreversibly~~ destroyed is determined by selecting the diameter of said conductive polyaniline fiber.

Claim 7 (currently amended): The heating apparatus as described in claim 1, wherein the temperature at which the conductivity of said conductive polyaniline fiber is ~~substantially irreversibly~~ destroyed is determined by selecting said at least one dopant.

Claim 8 (previously presented): The heating apparatus as described in claim 1, wherein maximum power generated by a chosen length of said conductive polyaniline fiber is determined by selecting the diameter of said conductive polyaniline fiber.

Claim 9 (previously presented): The heating apparatus as described in claim 1, wherein maximum power generated by a chosen length of said conductive polyaniline fiber is determined by selecting said at least one dopant.

Claim 10 (previously presented): The heating apparatus as described in claim 1, wherein said at least one dopant is ion exchanged with a selected dopant.

Claim 11 (previously presented): The heating apparatus as described in claim 1, wherein said conductive polyaniline fiber is dedoped to remove said at least one dopant, and redoped with a selected dopant.

SFST.03USU1

Claim 12 (original): The heating apparatus as described in claim 1, wherein said heating element is generated from substantially non-conductive polyaniline fiber or yarn comprising substantially non-conductive polyaniline fiber, after which said heating element is doped with at least one dopant such that the substantially non-conductive polyaniline fiber is comprised of at least one dopant and said conductive polyaniline fiber is characterized by a conductivity of ≥ 100 S/cm.

Claim 13 (canceled)

Claim 14 (canceled)

Claim 15 (canceled)

Claim 16 (canceled)

Claim 17 (canceled)

Claim 18 (canceled)

Claim 19 (canceled)

Claim 20 (canceled)

Claim 21 (canceled)

Claim 22 (canceled)

Claim 23 (canceled)

Claim 24 (canceled)

Claim 25 (canceled)

Claim 26 (canceled)

SFST.03USU1

Claim 27 (currently amended): A heating apparatus comprising in combination a conductive polyaniline fiber having at least one dopant and a chosen diameter, and characterized by an as-spun conductivity of ≥ 100 S/cm and an as-spun peak stress of ≥ 75 MPa, wherein the conductivity of said conductive polyaniline fiber is ~~substantially irreversibly~~ destroyed at temperatures lower than the temperature at which said conductive polyaniline fiber loses said at least one dopant, or the temperature at which said at least one dopant is decomposed, when a voltage or current greater than a voltage or current characteristic of the fiber is applied thereto by said means for applying a voltage or a current to said fiber; and means for applying a voltage or a current to said fiber.

Claim 28 (original): The heating apparatus as described in claim 27, wherein said conductive polyaniline fiber is further characterized by an as-spun modulus ≥ 1 GPa and an as-spun percent extension at fracture ≥ 10 .

Claim 29 (original): The heating apparatus as described in claim 27, wherein said fiber is generated from a solution comprising polyaniline, 2-acrylamido-2-methyl-1-propanesulfonic acid, dichloroacetic acid, and water.

Claim 30 (original): The heating apparatus as described in claim 29, wherein said fiber is spun using polyaniline having a molecular weight of $\geq 200,000$ g/mol.

Claim 31 (original): The heating apparatus as described in claim 29, wherein said solution is caused to coagulate by placing said fiber in contact with a liquid selected from the group consisting of ethyl acetate and 2-butanone.

Claim 32 (original): The heating apparatus as described in claim 30, wherein said fiber is placed in contact with phosphoric acid solution after being placed in contact with said liquid.

Claim 33 (original): The heating apparatus as described in claim 29, wherein said 2-acrylamido-2-methyl-1-propanesulfonic acid is ion exchanged with a selected dopant.

SFST.03USU1

Claim 34 (original): The heating apparatus as described in claim 29, wherein said conductive polyaniline fiber is dedoped to remove said 2-acrylamido-2-methyl-1-propanesulfonic acid, and redoped with a selected dopant.

Claim 35 (original): The heating apparatus as described above in claim 29, wherein said conductive polyaniline fiber is dedoped to remove said 2-acrylamido-2-methyl-1-propanesulfonic acid, and redoped with a selected dopant.

Claim 36 (canceled)

Claim 37 (currently amended): The heating apparatus as described in claim 27, wherein structural integrity of said fiber is not significantly affected when the conductivity thereof is ~~substantially irreversibly~~ destroyed subsequent to the voltage or current characteristic of said fiber being applied thereto.

Claim 38 (currently amended): The heating apparatus as described in claim 27, wherein the temperature at which the conductivity of said conductive polyaniline fiber is ~~substantially irreversibly~~ destroyed is determined by selecting said at least one dopant.

Claim 39 (currently amended): The heating apparatus as described in claim 27, wherein the temperature at which the conductivity of said conductive polyaniline fiber is ~~substantially irreversibly~~ destroyed is determined by selecting the diameter of said conductive polyaniline fiber.

Claim 40 (original): The heating apparatus as described in claim 27, wherein maximum power generated by a chosen length of said conductive polyaniline fiber is determined by selecting said at least one dopant.